Digital Control and the Earth Ecosystem Will the governance of the anthropocene be designed in East Asia?

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(preliminary draft)

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Abstract

Two major transformations are affecting humanity. The rapidly increasing mastery of information, that allows control to penetrate all spheres from society to biology, and the contemporary loss of domination humans have over their environment's behavior. Both consequences of technological development, the digital revolution and global warming have opposite impact in terms of control. Will the former help recover what the later is challenging? How governments are going to cope with technologies and planetary boundaries that evolve faster than they are themselves able to? What will be the role of autonomous intelligent systems and machines? Those are probably some of the most fundamental questions of our epoch. If it is hard to make predictions, there is a rising fear that the anthropocene could lead to digital authoritarian regimes. Interestingly though, while Western countries seem to mainly address these issues in each activity sector independently, various holistic models emerge in East-Asia. Technologies are integrated to serve global coherent political objectives. This paper considers some aspects of the related cyber-strategies in China and Japan.

1 Introduction

The Sustainable Development Goals, SDGs, adopted by United Nations Member States in 2015, have become a landmark to evaluate political answers to the challenges of the Earth's ecosystem. The 2018 SDG Index and Dashboard report[1] draws rather negative conclusions, observing that although most G20 countries have started SDGs implementation, important gaps remain. No country is on track towards achieving all SDGs and conflicts are leading to reversals in SDG progress. Progress towards sustainable consumption and production patterns is too slow. High-income countries generate negative SDG spillover effects. Finally, they note that inequalities in economic and social outcomes require better data. The potential connections with digital transformations, positive or negative, is not addressed though[2]. A rather bleak picture showing the difficulties for governments and economic actors to adapt to new realities. The 2018 edition of the Global Risks Report[3], doesn't depart from this picture. Figure 1 shows the risks (environmental in green, societal in red, technological in purple), with the highest likelihood (horizontal) and the most severe impact (vertical). Interestingly, cyberattacks are among a group of environmental risks, somehow exhibiting a new dimension of our complex environment.

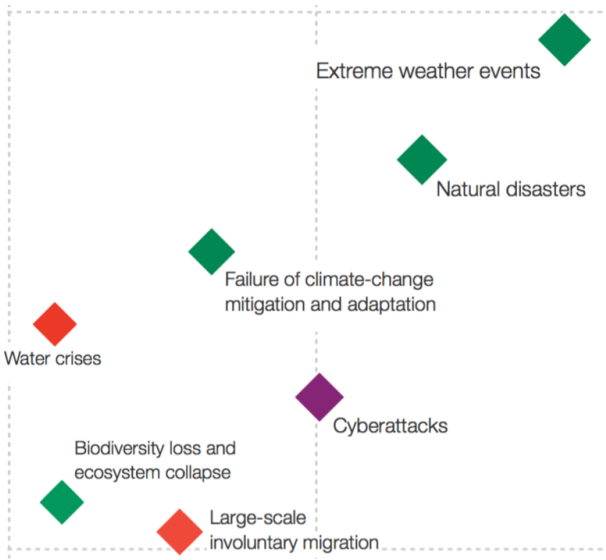

Figure 1: Most likely global risks with most severe impact according to WEF GRR 2018

Dealing with the complexity, taking into account the interdependencies between human activities and the natural ecosystem is one of the most titanic challenges for both academia

[1]Sachs, J., Schmidt-Traub, G., Kroll, C., Lafortune, G., Fuller, G. (2018): SDG Index and Dashboards Report 2018. New York: Bertelsmann Stiftung and Sustainable Development Solutions Network (SDSN). `http://www.sdgindex.org/reports/2018/`

[2]The word digital has not even a single occurrence in the SDG report. Neither do big data nor artificial intelligence for instance.

[3]The Global Risks Report 2018, 13th Edition. World Economic Forum. 2018

and governments alike. New policies are required, but also new economic and social models, new metrics to evaluate activity and impact, radically new ways of thinking. Such a comprehensive vision has been proposed by Peter Haff[4], who coined the expression "neoenvironment", as "*the sum of the natural, human, and technological systems and processes that surround us. It includes for example forest ecosystems, animals and machines, nanotechnology, the internet, highways, medical systems, power grids, human populations, political parties, governments and bureaucracies, robots and religions and their interactions with each other.*" Such a concept, which emerged from the spheres of natural sciences and encompasses all social dimensions, allows to take into account the complex interactions between domains that are perceived as independent, while their impact on or dependencies from other domains are simply neglected. It imposes a paradigm shift in the way humans conceive the different sectors of their society, as well as the different fields of academic studies. This is probably the most important contribution of the research activity carried on under the anthropocene flagship.

New trends have emerged in philosophy to reconsider our relation with nature. Among them the Natural Contract[5], published by Michel Serres in 1990, which proposed a new relationship between humans and nature extending Rousseau's social contract to the environment, had a strong influence. Another philosopher, taking inspiration in ancient Chinese philosophy, Zhao Tingyang, proposes a philosophy of harmonious co-existence, that as he advocates should be used in diplomatic relations to better apprehend the common environment. Interest for nature is not new in philosophy though and dates back from the antiquity. But the novelty is related to the status of nature. During the 19th century, the field of mesology was introduced to study the interrelationships between living organisms and all dimensions of their environment. It was pursued in the first half of the 20th century, by the German naturalist Jakob von Uexküll, who worked on the cybernetics of life and introduced the concept of Umwelt, and the Japanese philosopher Watsuji Tetsurô, who introduced the concept of fûdo. They distinguish the environment considered in abstracto from the outside, from the milieu seen from the point of view of living organisms and their interactions[6].

Recent technological developments are also leading to global systems, which undermine well established borders at all levels social, political, economic, and challenge our understanding of the world. The cyberspace results in a new dimension of our environment, which triggers a conceptual revolution of the same comprehensive type. It revolutionizes the interdependencies between all social actors, which increasingly exchange through the cyberspace and moreover are controlled from it. That encompasses also the management of resources, as well as the interdependencies with the natural ecosystem. The cyberspace establishes a new framework in which the adaptation and the mitigation of climate change will take place. It is much more than a technological tool or solution to problems. The cyberspace constitutes a completely new political setting, with new power imbalances and information asymmetries. This emerging reality seems to have been grasped by Japan and China in

[4]`https://cee.duke.edu/faculty/peter-haff`

[5]Serres, M. (1995). The natural contract. University of Michigan Press.

[6]Berque, A. (2018) Mesological foundations of sustainability. Lecture at the occasion of the reception of the Cosmos Prize.

very original ways. In Japan, the Society 5.0 project ambitions to use the cyberspace as a vector for a new societal model. In China, the Social Credit System, 社会信用体系, has similar ambitions, with a strong control and nudging component. What is striking in these projects developed in East Asia is the holistic visions they propose, which integrate not only all economic sectors, but also the natural environment, the social challenges, as well as the technology.

Europe has clearly a much less holistic vision of the construction of its future, even if it shares and is committed to the principles of the SDGs for instance. The 10 priorities published by the European Commission for the period 2015-19[7] demonstrate the sectorial division of the strategy in Europe. But Europe is also at a difficult political path, with serious uncertainties on the desired level of integration. After 60 years of growth of its structure, more countries, more competences, since the Treaty of Rome (1958), it enters a period of potential shrinkage, with countries possibly leaving the framework, as shown in the different scenarii[8] of the White paper[9], produced by the European Commission in 2017.

2 The mastery of information

The so-called "digital revolution" corresponds to a very rapid acceleration of the technological means to handle information. Information technologies expanded with the bloom of the industrial revolution in the 19th century. These technologies permitted to face the increasing complexity of industrial processes. Constructing a train has been made possible by the mastery of energy and thermodynamical systems, the steam engine. Constructing a railway system on the other hand requires to master information to deal with scheduling and ensure safety.

By the mid 19th century telegraph machines, which were under way since the 18th century, connected many places in the world and were widely accessible to the population from post offices. At the middle of the 20th century, the treatment of information was revolutionized with the digitization of information and the development of computers. Since then, the technological capacity of machines has grown exponentially (Moore law), and so did the diversification of their application (Bell law).

By the end of the 20th century, two orthogonal phenomena occurred. On one hand the development of huge data centers, with an astronomical concentration of information and computing power. The largest data centers consume today as much energy as a nuclear plant produces. On the other hand, the deployment of tiny information processing devices, which were to be embedded on everything including living organisms, multiplying to numbers that

[7]EU Commission priorities for 2015-19: Jobs, growth and investment; Digital single market; Energy union and climate; Internal market; A deeper and fairer economic and monetary union; A balanced and progressive trade policy to harness globalisation; Justice and fundamental rights; Migration; A stronger global actor; Democratic change. `https://ec.europa.eu/commission/priorities_en`

[8]scenario 1: carrying on; scenario 2: nothing but the single market; scenario 3: those who want more do more; scenario 4: doing less more efficiently; scenario 5: doing much more together.

[9]White paper on the future of Europe and the way forward. European Commission 2017. `https://ec.europa.eu/commission/future-europe/white-paper-future-europe-and-way-forward_en`

might soon reach 100 billions, and connecting humans, machines, the natural environment, public and working spaces, etc.

The association of micro monitoring devices connecting everything with mega data centers concentrating all data made it possible to remotely control society and offer services that would change the nature of exchanges in all societies. Intermediation platforms, that became the spearhead of the global transformation, allow to connect the sides of virtually any multisided market, with an extraordinary efficiency. Consumers and producers of services are now meeting on and exchanging through these platforms. They reach crazy records. In China for instance, Alibaba's Singles' Day shopping on 11/11/2018 reached more than 213 billion yuans. These corporations occupy now the top positions as world largest capitalizations, after they kicked away the oil industry. Very disruptive in various economic sectors, such as transportation and lodging, they have already transformed the press, which lost most of its titles in the last two decades, and are penetrating education and health very rapidly, despite legal constraints.

What platforms allow is new ways to distribute resources, with a control, which is operated remotely from the tangible world. Platforms render possible socio-economic mechanisms that were hardly imaginable in the past for very subtle reasons. They are all related to the capacity to treat information. To illustrate briefly such phenomena, let us consider two examples. Platforms made carpooling not only possible but extremely efficient. The novelty is related to the development of a new form of trust, horizontally established between the two sides of this market, the drivers and the passengers, which evaluate each other, and replaces the vertical trust provided by institutions. While this activity blooms, other actors penetrate the other sides of this multisided market, such as insurance companies for instance.

Platforms also offer alternative markets for resources, new ways to organize supply chains. In particular, they make smart electrical grid possible, ensuring the distribution of electricity produced by zillions of unreliable producers, to zillions of consumers, with priorities to ensure the functioning of critical collective infrastructures, such as hospitals, as well as in a household the prioritization of refrigeration appliances. It allows to move from a demand-driven approach, where the industry proudly satisfies the demand, to a distribution approach, where a non uniform production is distributed at best.

Platforms have widely exploited new types of feedback loops on information systems probably more than any other industry in the past. Essentially, these loops are based on the following frame: the more users a platform has, the more information can be collected, the better the services offered are, the bigger the capacity to attract more users. These loops explain the exponential growth of this industry and its unchallenged penetration in society.

The mastery of information deeply changes the organization of society. It could take many different paths that correspond to different political choices. But it is not restricted to the control of human activities. It penetrates deeply the natural spheres at different scales, allowing to control and modify living organisms as well as the environment. The genetic information of biological organisms can be modified, through technologies such as CRISPR/Cas9, which allow to edit genes within organisms more and more easily. Geo-engineering can act on the equilibria of the environment. At the same time, biological machines are being de-

veloped, bridging the gap between information handling through technological means and through the mechanism of living organisms.

3 The relation with the environment

The environment in which humans live, what constitutes their surrounding, has been decomposed into distinct areas such as natural, socio-cultural or technological for instance. Depending upon cultures, these components might be perceived as orthogonal, only loosely related dimensions, or instead as part of a whole, or somewhere between these two extreme positions. The strong attention drawn to relations between entities, beyond the entities themselves, so prevalent in East Asian cultures, induces probably a greater facility to pursue holistic approaches unifying social and natural aspects. There is a vast literature (see Callicot et al.[10] for instance) on the cultural grounding of the differences in the perception of nature, which is beyond the scope of this paper, but the cultural differences might be fundamental to understand the foundations of the emerging anthropocenic control society in East Asia.

Worrying about the state of the environment and questioning its relation with human activities is not a new phenomenon. In the Critias, Plato already related soil erosion to deforestation in 360 B.C. But it is only in the 1970s, thanks to the capacity to handle large amount of data automatically, that a more holistic perspective could be carried on. A complex system approach for Earth was proposed by Forrester[11], while the economic consequences on constraints on resources were addressed for the first time with such a precision in the very influential "Limits to Growth Report"[12] of the Club of Rome.

If models and predictions have made tremendous progress, the dependencies between resources, economy and society have been subject to different theories. At the end of the 18th century, in his famous Essay on population, Malthus, noted that "the power of population is indefinitely greater than the power in the Earth to produce subsistence for man". The rapid evolution of the human population, which almost doubled during the 19th century and tripled since WWII triggered alternative causalities, departing from neo-Malthusianism. This is the case in particular of Ester Boserup[13], who investigated the inverse causality, showing that population increase is in fact the driver of new developments in agriculture. Such subtle phenomena are also illustrated by Jevons' paradox, which states that technological improvement does not necessarily lead to resource frugality thanks to efficiency, but instead may lead to an increased consumption of resources, as was the case for coal use in the mid 19th century. There is an abundance of such examples in today's society, challenging the efforts towards a more frugal use of resources.

[10]Callicott, J. Baird, and Roger T. Ames, eds. Nature in Asian traditions of thought: essays in environmental philosophy. SUNY press, 1989.

[11]Forrester, Jay Wright. World dynamics. Vol. 59. Cambridge, MA: Wright-Allen Press, 1971.

[12]Meadows, D. H., et al. "The limits to growth: a report to the club of Rome. 1972.

[13]Boserup, Ester. The conditions of agricultural growth: The economics of agrarian change under population pressure. Routledge, 2017.

The implication of human activities on the Earth ecosystem is now the focus of intense research activities. Some landmark papers have been published in the current decade, on the sixth extinction[14], tipping point hypothesis[15], planetary boundaries[16] for human activities, or the risks related to feedback effects[17], to mention just a few examples. The converging conclusions of all these research efforts is that humanity's intense interaction with the ecosystems may provoke unexpected large-scale consequences, damageable for human societies as well of course as to other species.

This knowledge of the earth ecosystem is made possible by the increased capacity in information technologies, which allows for data collection and analysis, as well as the development of complex models. It also results of course from the accumulated knowledge in life and earth sciences. It should not be forgotten either that there is also a social component into this capacity to incrementally produce knowledge, related to the organization of the scientific community worldwide. The most visible and comprehensive contribution is now made in the framework of the United Nations, with the IPCC and the IPBES. The IPCC reports are based on the largest compilation of scientific work never realized in history[18].

But at the same time, the influence of the scientific community doesn't match its collective capacity. The dramatic importance of the predictions and warnings is almost unheard of. The weakness of the impact both in the public opinion as well as among the ruling elite is demonstrated by the poor media coverage, the weak political rhetoric, and the rather shallow economic decisions. The discrepancy is best demonstrated by the diverging projections of on one hand the energy consumption and production planned by political powers and on the other hand the carbon budget available to stay below the objective of 2°C temperature increase, produced by the scientific community. The two following figures illustrate this divergence. Figure 2 shows the projections of OPEC for the world oil demand depending upon economic growth sensitivities[19]. Figure 3 on the other hand shows various scenarii to use the carbon budget of around 600 gigatonnes of carbon dioxide left to emit before the planet warms dangerously by more than 1.5-2°C[20].

[14]Barnosky, Anthony D., et al. "Has the Earth's sixth mass extinction already arrived?." Nature 471.7336 (2011)

[15]Barnosky, Anthony D., et al. "Approaching a state shift in Earth's biosphere." Nature 486.7401 (2012)

[16]Steffen, Will, et al. "Planetary boundaries: Guiding human development on a changing planet." Science 347.6223 (2015)

[17]Steffen, Will, et al. "Trajectories of the Earth System in the Anthropocene." Proceedings of the National Academy of Sciences 115.33 (2018)

[18]IPCC, the world's top authority on climate science. October 2018. `https://phys.org/news/2018-10-ipcc-world-authority-climate-science.html`

[19]World Oil Outlook 2040. OPEC 2017. `https://www.opec.org/opec_web/flipbook/WOO2017/WOO2017/assets/common/downloads/WOO%202017.pdf`

[20]Figueres, Christiana, et al. "Three years to safeguard our climate." Nature News 546.7660 (2017): 593.

The dramatic discrepancy between economic projections and scientific warnings

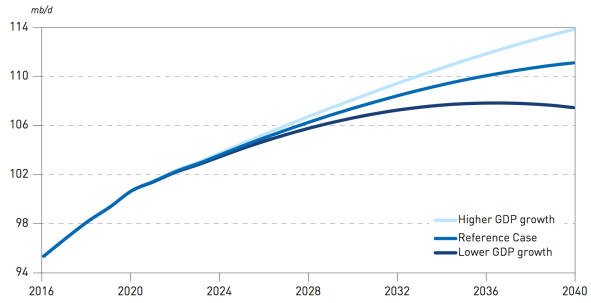

Figure 2: World oil demand

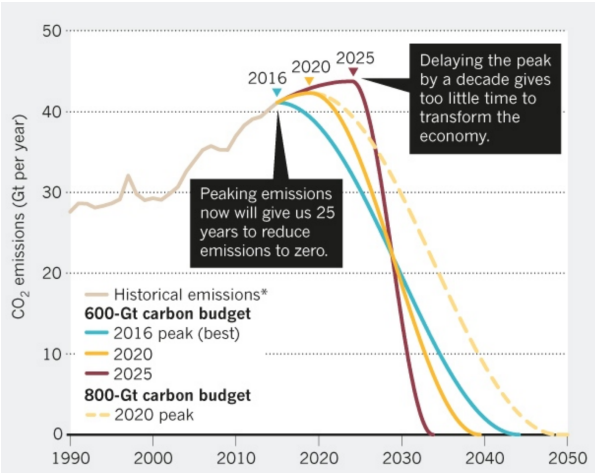

Figure 3: Carbon crunch

4 The construction of the Cyberspace

A clear difficulty arrises while humanity is trying to cope with these global interdependent issues. The political system, relying on sovereign States, a body of international conventions regarding their relationships, as well as their right over specific non-national spaces such as the sea or the atmosphere, together with rules on the relationships between multinational corporations and States, seems poorly adapted to the challenges of the Earth ecosystem.

Interestingly though, this equilibrium is affected by the emergence of a new space, the cyberspace. This space extends beyond the limits of national territories, much like spaces of the natural environment of the planet, for which international conventions have been adopted to ensure their protection (high sea, Antarctic, outer space, etc.), but unlike the later, it is constructed by humanity with technological means.

The cyberspace relies on technological infrastructures such as submarine cables, data centers, as well as zillions of devices. As such it is embedded both in the physical geography, as well as in the political and economic system. Its structure is constrained by their realities. Being very new, it will most probably considerably evolve. Many tensions have arisen on issues such as the role of States vs private corporations, or the treatment which can be made of personal information for instance. The question of its global governance and the establishment of the rules of war into the cyberspace[21] constitute other sources of divergence. The current structure, qualified of regime complex by Joseph Nye, relies on a complex system of independent, overlapping and often inconsistent institutions. They deploy their power and influence on its numerous aspects, including uniformisation and standards, physical infrastructures, technologies, surveillance and intelligence, military and defense, regulations,

[21]Nye, Joseph, Cyberpower. Harvard Kennedy School. 2010

or ideological issues[22]. These issues evolve under the pressure of both hard and soft power. They will mature with the development of new technologies and usages, as well as the evolution of the political systems and the balance of power between actors.

While it is clear that the cyberspace is embedded into the physical and political worlds, the converse is increasingly true as well. Most human activities rely now on exchanges through the cyberspace. And so does the access to information, whether knowledge or news, whether trustable or fake. That space is also a normative one. New norms that spread globally change the economic and social interactions between people as well as instituions. The cyberspace operates a control over an increasing part of human activities, whether in the private sphere or in the open sphere of work and public spaces. But this control goes beyond humans, encompassing agriculture, health, pollution, climate, etc. The cyberspace is the global sphere of control of everything, everywhere and at anytime.

One can wonder what the use of such a global control capacity might be. It has probably not been designed and developed as such, but now it is there for the whole of society, and requires some political thinking. Of course advanced military and intelligence services included that dimension into their strategic thinking from the early days, but other sectors of public administration had been, and sometimes still are, unaware of the importance of the transformation. This is due to the sectorial thinking that is dominant in both the academic and the governing spheres. But now that the preservation of reasonable conditions for the Earth ecosystem is the most important challenge of humanity, it ought to be part of the strategic thinking around the cyberspace, beyond local optimization as proposed with the concept of smart cities for instance. New models of thought seem necessary to go beyond the present setting.

A very original approach has been pursued by Zhao Tingyang, who revisited the very ancient concept of *Tianxia*, 天下, all under heaven, dating back from the Zhou dynasty, circa 1000 BC, which advocates harmonious coexistence mechanisms for the world order[23]. Like many authors, Zhao Tingyang proposes a game theoretic approach to the interactions. He calls irrational a strategy that has self-defeating consequences when universally adopted, and rational a strategy that takes into account the question of coexistence and is rewarding when universally adopted. Clearly, the present world strategy belongs to the irrational ones, for its damaging effect on the common environment. Politics become the art of co-existence by the transformation of hostility into hospitality. Zhao Tingyang asserts that to take into account the complexity of the world today, "it would have to be built on the broader foundation of a compatible universalism that includes all civilizations — not an exclusive unilateral claim of one civilization to universality"[24]. New notions of optimality, which constitute alternatives to Pareto equilibrium derive from this approach.

Some practical approaches to achieve a rational strategy in the sense of Zhao Tingyang have been proposed. The concept of Future design[25] developed in Japan for instance, aims

[22]Nye, Joseph. Normative restraints on cyber conflict. Cyber Security 1(4), 331-342. 2018

[23]Zhao Tingyang. The Tianxia System: An Introduction to the Philosophy of a World Institution. 2011

[24]Zhao Tingyang. Can this ancient Chinese philosophy save us from global chaos? Washington Post. 07.02.2018. `https://www.washingtonpost.com/news/theworldpost/wp/2018/02/07/tianxia/`

[25]Kamijo, Y., Komiya, A., Mifune, N., & Saijo, T. (2017). Negotiating with the future: incorporating

at incorporating future generations in the decision processes, thus ensuring diachronic coexistence. Conceptual frameworks, that go beyond scientific knowledge, and integrate cultural perceptions of the environment have been proposed[26], as well as more generally the capacity to adapt to indigenous knowledge[27], which is pursued by the Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES).

The "Society 5.0" project, proposed in the 5th Science and Technology Basic Plan, endorsed in 2016 by the Japanese government, belongs to the rare examples of comprehensive approaches pursued at the national level. It aims at constructing "a human-centered society that balances economic advancement with the resolution of social problems by a system that highly integrates cyberspace and physical space"[28]. The "5.0" corresponds to a rather rough model of the evolution of human societies, following the hunting society (Society 1.0), agricultural society (Society 2.0), industrial society (Society 3.0), and information society (Society 4.0).

Clearly, the anthropocene is calling for a teleologic vision, where the future can be understood as the continuation of the long history of humanity, not only by looking at the last decades or centuries, but by building upon the early stages of humanity. The success of Yuval Harari's book, Sapiens[29], demonstrates the desire for this long perspective on the fate of humanity. Undoubtedly, Society 5.0 belongs to this trend. But at the same time, there is something vertiginous in the acceleration that it implies. The length of each epoch is exponentially shorter than the previous one, agricultural lasted thousands of years, industrial, hundreds, information, dozens, thus immediately raising the question of the duration of Society 5.0, and consequently what would come next.

It is therefore obviously merely a slogan than a scientific construction, and it should be noted that there is at this stage little work in the academic realm on Society 5.0. But as a model, there is something interesting and generous, which encompasses the two aspects of the digital and the earth ecosystem and provides a vocation for the digital. Something strikingly different from the EU projection for instance, although the concept does have some followers there[30]. But Japan exhibits a very strong ambition. It aims to become the first country in the world to achieve this human-centered society. In that quest, it might benefit from the familiarity of the population with cyborgs[31].

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imaginary future generations into negotiations. Sustainability science, 12(3), 409-420.

[26]Niles, D., & Tachimoto, N. (2018). Science and the experience of nature. Nature Sustainability, 1.

[27]Díaz, Sandra, et al. "The IPBES Conceptual Framework—connecting nature and people." Current Opinion in Environmental Sustainability 14 (2015): 1-16.

[28]Society 5.0 `http://www8.cao.go.jp/cstp/english/society5_0/index.html`

[29]Harari, Y. N. (2014). Sapiens: A brief history of humankind. Random House.

[30]Rattia, Bruno. "Geographic Knowledge. Paradigm of Society 5.0." Rivista J-Reading n. 1-2018: Journal of research and didactics in geography (2018): 123. `http://www.j-reading.org/index.php/geography/article/viewFile/198/161`

[31]Murata, Kiyoshi, et al. "From a science fiction to reality: cyborg ethics in Japan." ACM SIGCAS Computers and Society 47.3 (2017): 72-85.

5 Anthropocenic control

China is probably the most advanced country for anthropocenic control, that is the control of things, institutions, as well as the population in relation to the environment. One reason might be that it is facing a particularly harsh environmental threat. According to an MIT study, China's most populous and agriculturally important region could be suffering the most damaging heat effects, at least as far as human life is concerned, of any place on the planet[32].

China is also, together with the US, the country, that has made the largest investment in the construction of the cyberspace. Two of its digital platforms, Tencent and Alibaba are among the Top world market capitalizations and among the largest for the number of users. Its investments in AI compete with those of the US[33], reminding the space competition between the US and the USSR during the cold war. A recent event, which is also a landmark in human history, illustrates the symbolic aspect of the present competition. In 2017, the victory in the game of go of a machine, AlphaGo, against the World champion, Ke Jie, attracted a tremendous interest in China. There are two dimensions in this event, machine vs human, and West vs East. AlphaGo is developed by DeepMind, a British AI corporation, now a subsidiary of Alphabet. In China the event had a strong impact, triggering a race for AI, much like Gagarin's first human journey into outer space contributed to accelerate the US space program.

In his famously long speech for the 19th National Congress of the Chinese Communist Party in October 2017, president Xi Jinping mentioned the decisive role of artificial intelligence and big data to achieve the "China dream". Since then, the Social Credit System, probably one of the most original experimental projects of digital governance has been accelerated. This system aims at controlling as well as nudging both people and institutions into rule-abiding behavior, analyzing in real time the conformity of their behaviors with norms. It will result in social and economic incentives for those who behave in a socially, ecologically and economically responsible manner, through mostly soft versus coercive governing techniques.

The government is taking drastic measures to address sustainability, which have a lot of rather innovative forms. They are authoritarian but only partially coercive. They seem rather welcomed, and are supported in the government and academia circles as well as by the population[34], while they are under a flow of drastic critics in the Western press. They make use of new metrics, such as green GDP, which combine environmental and social data. They rebalance local and global power through new information asymmetries between locally assembled data, and State level global data. They also contribute to China soft power on the international scene, where its image of polluting power is strong.

Although the first experiments with green GDP were developed under the Hu Jintao

[32]David L. Chandler. China could face deadly heat waves due to climate change. MIT News Office. July 31, 2018 `http://news.mit.edu/2018/china-could-face-deadly-heat-waves-due-climate-change-0731`

[33]Nicholas Thompson & Ian Bremmer. The AI Cold War That Threatens Us All. Wired 10.23.18. `https://www.wired.com/story/ai-cold-war-china-could-doom-us-all/`

[34]Genia Kostka. China's Social Credit Systems and Public Opinion: Explaining High Levels of Approval. SSRN Aug 2018 `https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3215138`

administration as early as 2004, they were abandoned at the time of the global financial crisis of 2008, after much struggle for both political and technical reasons. The methods were highly debatable and did not reach consensus among the administrations involved in the process. Moreover since environmental goals challenged economic and political interests, it reduced the goodwill to upload environmental data to the central authorities, a recurring issue in China statistics[35].

The environmental law of 2014 reactivated the Green GDP project, as Green GDP 2.0. The administration overcame some of the technical and political problems with accounting by relying more on environmental big data and digital control mechanisms. It is under the joint control of the National Bureau of Statistics (NBS) and the State Environmental Protection Agency (SEPA). The Ministry of Environmental Protection can now more easily bypass local administrations by making use for instance of satellite data for monitoring the environment. But statistics are still subject of intense controversies[36], raising concerns about their reliability. Both political and methodological issues are at stake.

China has coined the concept of "ecological civilization", with political and legal implications. It was already among the main goals of the country's overall development plan at the 18th National Congress of the Chinese Communist Party in 2012, but has gained importance under the Xi Jinping administration. Green GDP induces new law enforcement mechanisms and new balances between the central and local governments, new ways to evaluate officials as well. Beyond resource use and environmental depletion, the control expands to individuals and companies as part of the Social scoring.

Xi Jinping made the binding character of the ecological civilization rather clear in his aforementioned long speech of 2017. He highlighted the need to develop the country's ecological monitoring systems to manage natural resources, protect natural ecosystems, and promote environmentally friendly growth patterns and lifestyles. A more comprehensive concept of security has emerged, encompassing non-traditional risks, ranging from political to economic, social to technological, informational to ecological[37].

6 Conclusion

China and Japan ambition to be pioneer in the design and deployment of compatible social and ecological societies making full use of digital technology, thus setting the standards worldwide. Obviously, the ecological emergency could reinforce the need for control and nudge mechanisms of society and natural ecosystems, making environmental authoritarian governance more attractive for governments worldwide. The attitude towards technology and the related ethical and political issues will be determinant. While AI has been perceived

[35]Li, V., & Lang, G. (2010). China's "Green GDP" experiment and the struggle for ecological modernisation. Journal of Contemporary Asia, 40(1), 44-62.

[36]A new set of Chinese economic figures adds up to yet another headache for statisticians. SCMP. 15.10.2018. https://www.scmp.com/news/china/economy/article/2161258/new-set-chinese-economic-figures-adds-yet-another-headache

[37]Cuihong, Cai. "China and Global Cyber Governance: Main Principles and Debates." Asian Perspective 42.4 (2018): 647-662. http://journals.rienner.com/doi/abs/10.5555/0258-9184-42.4.647

as potentially disruptive if not dangerous in the public debate in the West[38], it is probably more perceived as a potential than a threat in Asia. There is at this stage little enthusiasm and probably interest in the West for such environmental nudging systems, but things could change rapidly. Critiques abound in the West on the Chinese Social Scoring, but very similar techniques have been deployed by data brokers in the US for private, often financial, interests. Europe has developed a political model, rooted in the political philosophy of the Enlightenment, that the West promoted urbi et orbi during the 20th century for its universal — contested though — values. Will the next political model, compatible with the natural environment, emerged from Asia?

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